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No. 1

CITY OF BOSTON

Report No. 1

BRIDGE AND FERRY DIVISION
of the
PUBLIC WORKS DEPARTMENT

September 1, 1948

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GRIFFENHAGEN & ASSOCIATES
CONSULTANTS IN ADMINISTRATION AND FINANCE

CITY OF BOSTON

Report No. 1

BRIDGE AND FERRY DIVISION
of the
PUBLIC WORKS DEPARTMENT

September 1, 1948

Prepared by
Griffenhagen & Associates
Consultants in Public Administration and Finance

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Parts 1-31
except 15, 22, 23 & 26

Boston Finance Commission
Sept. 14, 1954

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GRIFFENHAGEN & ASSOCIATES
(Established 1911)
Consultants in Public Administration and Finance

Boston 8
September 1, 1948

The Honorable,
The Chairman and the Members
of the
Finance Commission of the City of Boston
24 School Street
Boston 8, Massachusetts

Dear Sirs:

Presented herewith is our Report No. 1 covering the Bridge and Ferry Division of the Public Works Department.

Faithfully yours,

Griffenhagen & Associates
Griffenhagen & Associates

SUMMARY OF FINDINGS

The bridge and ferry division is one of the five principal divisions of the public works department. The division consists of three subdivisions, bridge, ferry, and tunnel, and has a staff of approximately 395 employes.

The operating force of the 13 movable bridges under the jurisdiction of the division is overmanned. The bridges have been permitted to deteriorate by neglected maintenance in spite of some excess in personnel that appears to exist in the maintenance force. The financing of all inter-city bridges is not shared by all of the adjacent communities served by these structures.

There is reasonable doubt as to the justification of continuing the ferry service in view of the limited number of people that are benefited thereby. The tolls are too low in all but three classifications. The City may be facing expensive repairs to terminal properties and to the ferry boats if the service is continued for another ten years. Some excess appears to exist in personnel assigned to the ferry service, particularly in the maintenance force.

The Sumner Tunnel appears to be operated efficiently, the organization of the staff of the tunnel subdivision appears reasonably satisfactory, and the superintendent is to be commended for his ingenuity in developing mechanical equipment to reduce manpower requirements.

SUMMARY OF RECOMMENDATIONS

The recommendations expressed or implied in Report No. 1 on the bridge and ferry division of the public works department may be summarized as follows:

1. Establish a position of deputy division engineer and make the deputy the head of the bridge subdivision. Also, assign to the deputy certain supervisory duties over the ferry and tunnel subdivisions as the division engineer may direct and provide that the deputy shall assume the duties and responsibilities of the division engineer in the latter's absence. (Sec. 3)

2. Make the deputy division engineer responsible for the work of an office clerical force for the entire division. (Sec. 3)

3. Reduce by five the number of employes assigned to the maintenance force of the bridge service (Sec. 4a)

4. Install power-operated gates and traffic lights on the Broadway and Dover Street bridges and reduce the operating force to two men on the 8:00 a.m. to 4:00 p.m. and the 4:00 p.m. to midnight shifts and to one man on the midnight to 8:00 a.m. shift. (Sec. 4b)

5. Consider the possibility of placing in operation the power-operated gates and traffic lights presently installed on the Chelsea South bridge and installing traffic lights on the Congress Street bridge so as to permit the operation of the power-operated gates already installed on that structure. (Sec. 4b)

6. Install power-operated gates and traffic lights on the Meridian Street and Warren bridges when these structures are replaced with new bridges as scheduled by the department in its capital outlay program. (Section 4b)

7. Study the feasibility of installing and operating power-operated gates and traffic lights on the Northern Avenue, Summer Street, Summer Street over Reserved Channel, Malden, and Chelsea Street bridges. (Sec. 4b)

8. Set up and follow a preventive maintenance schedule, particularly for the movable bridges, and appropriate two hundred and fifty thousand dollars ($250,000) a year for bridge repairs for the next five years. (Sec. 4c)

9. Reduce the daily hours of operation of the ferry from sixteen to twelve. (Sec. 5a)

10. Increase foot passenger fares on the ferry to five cents and motor vehicle tolls to one half the tunnel rates. Discontinue the ferry service if revenues decline appreciably after this increase. (Sec. 5b)

11. Reduce the number of ferry boat crews from four to three and leave vacancies unfilled in the maintenance force that develop during the period when experimentation with fare adjustments is taking place. (Sec. 5b)

12. With respect to the tunnel service, continue, with minor refinements, the policies and procedures that have been adopted by the superintendent. (Sec. 6a)

BRIDGE AND FERRY DIVISION
OF THE
PUBLIC WORKS DEPARTMENT

1. Introduction

The bridge and ferry division is one of the five principal divisions of the public works department. The staff of the division, as of June 15, 1948, consisted of the division engineer and 394 employes. 219 employes were in the bridge service, 98 in the tunnel service, and 77 in the ferry service.

2. Functions and Activities

The functions and activities of the bridge and ferry division may be summarized as follows:

Designing, constructing, and maintaining bridges
Operating movable bridges
Operating and maintaining the Sumner Traffic Tunnel
Operating the ferry service between Boston and East Boston
Maintaining the ferry boats.

3. General Plan of Organization

The division consists of three subdivisions known as the bridge subdivision (bridge service), the ferry subdivision (ferry service), and the tunnel subdivision (tunnel service). The division is headed by a division engineer who receives an annual salary of $6,500 and who personally directs the work and employes of the bridge subdivision. The supervisor of the ferry subdivision and the superintendent of the tunnel division report to the division engineer.

The titles of the heads of organization units in the division, the lines of authority (indicated by indentations), the number of employes in each unit, the title of each unit, and the subdivisions in which each unit is located are shown in the following tabulation:

Title of the Unit Head	No. of Employes in Unit	Title of Unit	Sub-division
Division engineer	1	-	-
Executive clerk	6	Clerical force	Bridge
Engineer, Grade V	1	Special engrg. unit	Bridge
Engineer, Grade V	4	Office engrg. force	Bridge
Engineer, Grade V	8	Constructive engrg. force	Bridge
Supervisor of bridges	200	Bridge operation & maint. force	Bridge
Supervisor (master machinist)	77	Ferry subdivision	Ferry
Superintendent	98	Tunnel subdivision	Tunnel
Total number of employes	395		

With the exceptions discussed below, the present organization framework of the division appears to be satisfactory. No provision has been made for someone to assume the duties and responsibilities of the division engineer in his absence. Therefore, it is recommended that a position of deputy division engineer be established and that the deputy be made the head of the bridge subdivision. It is recommended also that the deputy division engineer supervise certain activities of the ferry and tunnel subdivisions as directed by the division engineer and that the deputy assume the duties and responsibilities of the division engineer when the latter is not on duty. Further, it is recommended that the work of the office clerical force for the entire division be made the responsibility of the deputy division engineer.

4. Bridge Subdivision

a. Staff of the Bridge Subdivision: At the present time the bridge subdivision does not have an administrative head other than the division engineer. The head of each of the five units within the subdivision reports direct to the division engineer. However, as stated in the preceding section, it is recommended that a deputy division engineer be made the administrative head of the bridge subdivision.

The bridge subdivision consists of five organization units and a total of 219 employes as shown in the following tabulation in which indentations indicate descending lines of authority:

Position	No. of Positions	Pay Rate Weekly	Pay Rate Annual	Annual Cost
Division engineer	-	-	-	-
Clerical force				
Executive clerk	1	-	$3700	$ 3,700
Clerk	1	-	3000	3,000
Clerk	1	-	2700	2,700
Clerk	1	-	2500	2,500
Clerk	1	-	2300	2,300
Clerk	1	-	1800	1,800
Sub-totals	6			$ 16,000
Special engineering unit				
Engineer Grade V	1	-	$3800	$ 3,800
Office engineering force				
Engineer Grade V	1	-	$4000	$ 4,000
Engineer Grade IV	1	-	3500	3,500
Engineer Grade III	2	-	3100	6,200
Sub-totals	4			$ 13,700
Construction engr. force				
Engineer Grade V	1	-	$4000	$ 4,000
Engineer Grade III	1	-	3100	3,100
Engineer Grade III	2	-	2800	5,600
Engineer Grade II	1		2300	2,300
Engineer Grade I	1		1600	1,600
Inspector	2		2700	5,400
Sub-totals	8			$ 22,000
Bridge operating and maintenance force				
Supervisor of bridges	1	-	$3400	$ 3,400
Drawtender	13	-	2500	32,500
First asst. drawtenders	41	-	2300	94,300
Second asst. drawtenders	108	-	2200	237,600
Foreman	1	-	3000	3,000
Sub-foreman	1	-	2600	2,600
Sub-foreman	2	$47.76	2484	4,968
Machinist	2	47.76	2484	4,968
Electrician	1	47.76	2484	2,484
Carpenter	11	44.76	2328	25,608
Painter	3	44.76	2328	6,984
Paver	1	44.76	2328	2,328
Chauffeur-laborer	5	41.76	2172	10,860
Caretaker	1	40.26	2094	2,094
Yardman	1	-	2050	2,050
Laborer-watchman	6	38.76	2016	12,096
Clerk	2	-	2200	4,400
Sub-totals	200			$452,240
Grand totals	219			$507,740

At present, some of the administrative work load of the division engineer is shared by an employe designated as "engineer of special work." This employe, however, does not exercise supervision over the activities of other units in the bridge subdivision or over the tunnel or the ferry subdivisions.

The largest unit in the bridge subdivision is under the supervisor of bridges and consists of the 200 employes in the bridge operating and maintenance crews. There are 13 movable bridges under the jurisdiction of the bridge subdivision. These permit vehicle and pedestrian traffic over important waterways that are a part of Boston Harbor. However, the City of Boston does not maintain and operate all of the movable bridges used by the public within the City or connecting the City with adjacent communities. The Commonwealth of Massachusetts and the Metropolitan District Commission are responsible for maintaining and operating certain drawbridges under various legislative directives.

To operate the 13 movable bridges referred to above, there were 13 drawtenders, 41 first assistant drawtenders,and 108 second assistant drawtenders as of June 15, 1948. To maintain the 13 movable bridges and about 100 fixed bridges there were 37 employes including a foreman, as of the same date. Responsibility for the maintenance of 40 or more of the fixed bridges is shared with adjacent communities or with one of the three railroad lines serving the City. In addition to maintenance work, the group of 37 employes keep certain records and control the storage and distribution of materials and supplies.

Drawtenders and assistants are provided with printed instructions outlining their duties and responsibilities but the work of the maintenance crew and that of clerical employes is not as well defined. Maintenance schedules for the care of either movable or fixed bridges have not been established. The division engineer says that this has not been possible as his present annual appropriation for maintenance, while adequate under normal circumstances, is now directed to the correction of conditions that are the outgrowth of more than ten years of appropriations that were insufficient to maintain the bridge structures properly.

Very little cost analysis work is done in the division. Cost records as now prepared are entirely historical and are not used for administrative purposes. Estimates are prepared for new construction and for major repairs but project costs as such are not kept in detail nor analyzed in such a manner as to make it possible for the division engineer to demonstrate beyond question the necessity for the replacement of a structure because of excessive maintenance costs.

The bridge subdivision has three passenger automobiles including the 1948 Buick sedan assigned to the division engineer. One 1946 Ford sedan is assigned to the construction engineer and one to the bridge superintendent. Five trucks ranging in size from a 1/2-ton pickup to a 5-9-ton platform unit appear to be adequate to meet the needs of the maintenance crew.

Non-automotive equipment assigned to the bridge subdivision appears adequate although no marine equipment is available of the type that would permit repairs by force account to structures underwater or, in general, below dock level.

Substantial reductions in staff could be obtained if it were possible to install automatic, power-operated gates and traffic lights on the nine bridges. It is recognized that there are many factors, beyond the scope of this study, which must be given consideration before any such installation can be approved. However, as such installations would permit 37 positions of second assistant drawtender to be eliminated at a saving of $81,000 a year, considerable investigation of the merits of such a possibility seems to be warranted.

It is believed that the number of employes under the maintenance foreman could be reduced from 36 to 31 if adjustments recommended below are made in the composition of the labor force. It is recommended that (1) the positions of paver and caretaker be eliminated, (2) the number of chauffeur-laborers be reduced from five to three, (3) the number of laborer-watchmen be reduced from six to four, (4) the number of clerks be reduced from two to one, (5) the number of carpenters be increased from eleven to twelve, and (6) the number of painters be increased from three to four. The net reduction of five positions would result in an annual saving in wages of approximately $11,000. By such a reduction, it is believed that there would be no impairment of maintenance service and that the supervisor of bridges would be able to increase the amount of painting and carpentry work that is so necessary.

b. Bridge Service: The 13 drawbridges under the jurisdiction of the bridge and ferry division are manned 24 hours a day and 7 days a week. During a few hours each day certain bridges are not moved to allow for the passage of vessels. This restriction, established by the War Department, is due to heavy vehicle traffic and to heavy train movements incidental to the morning and evening rush hours. However, all of the bridges must be manned and be capable of being moved at all times for such emergencies as the passage of fireboats.

With two exceptions, the movable bridges are manned by full crews of three men. The crews on the Dover Street and Broadway bridges are reduced from three to two men each day between 4:00 p.m. and 8:00 a.m. because requests for bridge movements during these hours are negligible. The waterborne traffic below these bridges has declined substantially during the past 20 years to the point where the bridges are moved only 500 to 600 times a year, or an average of less than two movements in each 24-hour period.

It is recommended that (1) automatic gates and traffic lights be installed on the Dover Street and Broadway bridges, (2) the number of operators be limited to two between the hours of 8:00 a.m. and midnight, and (3) the number of operators be limited to one between the hours of midnight and 8:00 a.m. This reduction in the number of operators will coincide with plans of the State department of public works for the operation of the Dorchester Avenue bridge crossing Fort Point Channel downstream from the Broadway bridge. This reduction of force between midnight and 8:00 a.m. is also made possible because, according to War Department regulations, the bridges must not be moved between 6:15 a.m. and 8:00 a.m. except for one ten-minute period under high tide conditions.

Plans of the department call for (1) the immediate replacement of the Meridian Street bridge, which is one of the older swing-type spans, with a double-bascule type structure, and (2) the replacement of the present Warren bridge, which has a retractile type span, with a new single-bascule type span. It is recommended that careful study be made of the feasibility of installing power-operated gates with traffic lights on both of these new bridges. Traffic regulations confine the flow of vehicle traffic on Warren to in-bound movement and it would seem that this condition would favor the use of gates.

It would, at the present time, appear unwise to make capital outlays on either Chelsea North or Chelsea South bridges. The latter has automatic gates and a flashing type of traffic light. The gates on this bridge have not been used for several years because of mechanical trouble that seems traceable to their design which is of the overhead type. When closed these gates drop into a recessed track which frequently becomes clogged with ice and snow during the winter months, thus impeding opening and closing the barrier. If these gates can be placed in operation again for a nominal cost, permitting a reduction in the bridge operating force, this step is recommended.

On the Charlestown bridge, a crew of four operators is on duty 24 hours a day as the controls are so located that the man operating the span cannot see the channel nor the roadway. The fourth man is stationed on the pier. Considering the importance of this bridge as a traffic artery and as a vital link in the rapid transit system, this practice appears to be justified.

It would appear that a reduction in operating crews would be possible on the Northern Avenue, Congress Street, Summer Street, Summer Street over Reserved Channel, Malden, and Chelsea Street bridges, if power-operated gates and regulation traffic lights were installed. Gates are already installed, but are operated manually on the Congress Street bridge, and traffic lights are in operation on certain of the other bridges.

It is believed that with the installation of proper safety devices a reduction in operating crews to a maximum of two is possible for eight of the thirteen drawbridges under the jurisdiction of the division. Further, as stated previously, it is believed possible to reduce the operating crew to one man on the midnight to 8:00 a.m. shift on the Dover Street and Broadway bridges. A more detailed study of both marine and vehicle traffic by the division may reveal that this shift could be reduced to one operator on one or more of the other six bridges, namely Northern Avenue, Congress Street, Summer Street, Summer Street Extension over Reserved Channel, Chelsea Street, and Malden. The Metropolitan District Commission operates all of its spans, except the span at the Charles River Dam, with one operator for each shift. Four operators are stationed at the Charles River Dam to operate both the drawbridge and the lock. The Metropolitan District Commission bridges controlled by a single operator include the General Edwards Bridge in Revere, the Malden River Bridge on the Revere Beach Parkway, the Wellington Bridge over the Mystic River, the Dorchester Bay Bridge on the old Colony Parkway, and the Neponset River bridges connecting Boston and Quincy. These spans are on thoroughfares that are heavily traveled.

c. Bridge Revenues and Expenditures: The City of Chelsea, by decision of the State Supreme Court following the recommendation of a special commission appointed by the Court in 1912, is directed to reimburse Boston for 35 percent of the maintenance of the Chelsea North and Meridian Street bridges, and the City of Revere is obliged to contribute five percent of the upkeep of the Chelsea North bridge. The City of Boston has found it increasingly difficult to collect these assessments. It would appear that the City of Chelsea should share in the maintenance and operation of the Chelsea Street bridge and the City of Everett should contribute to the maintenance and operation of the Malden bridge. It is recommended that the commissioner request the legal department of the City to reopen the matter of the reallocation of cost of operation and maintenance of the last two named bridges. The commission in 1912 recommended that the City of Chelsea share the cost of the Chelsea North and Meridian Street structures only. The removal of Chelsea North bridge to make way for the Mystic River high level bridge may provide added support for the allocation of costs of the Chelsea Street span.

The expenditures in 1947 for each of the 13 movable bridges under the jurisdiction of the division are tabulated below together with the total expenditures of the division for the operation and maintenance of these structures:

Name of Bridge	Item of Expenditure Drawtender Salaries	Mechanic Salaries	Material	Repair Bills	Supplies	Total
Broadway	$ 20,265	$ 4,420	$ 1,134	$ 1,148	$ 431	$ 27,398
Charlestown	36,446	5,036	2,475	3,880	1,070	48,907
Chelsea North	27,534	2,616	777	8,970	1,314	41,211
Chelsea South	26,673	1,957	709	1,559	768	31,665
Chelsea Street	25,969	2,398	862	1,458	714	31,401
Congress Street	26,841	1,615	913	1.333	692	31,394
Dover Street	20,824	2,000	360	1.274	443	24,902
Malden	26,359	510	45	812	888	28,614
Meridian	26,074	3,316	1,581	874	616	32,462
Northern Avenue	27,513	3,784	1,017	4,289	3,182	39,784
Summer Street	27,476	2,946	357	2,398	476	33,653
Summer Street Ext.	26,288	1,691	143	1,228	1,160	30,510
Warren	26,773	8,040	3,351	3,360	779	42,303
All bridges	$345,034	$40,330	$13,723	$32,583	$12,533	$444,203

The bridge and ferry division is handicapped in the development of a maintenance program by existing uncertainty as to the status of certain structures. While provision has been made for the discontinuance of Chelsea North bridge upon completion of the Mystic River structure, the legislation authorizing the new high level bridge does not provide for the elimination of the Chelsea South bridge. The division, however, is planning to eliminate this structure and to provide access to the Mystic Wharf area by a public way from Medford Street, Charlestown. Upon the completion of the Mystic River bridge and the removal of the Chelsea North bridge, the only purpose that Chelsea South would serve is to provide access to Mystic Wharf via a ramp from Chelsea Street, Charlestown.

Because of this uncertainty as to the immediate status of Chelsea South, the repainting of the structure has been deferred beyond the period considered advisable for proper maintenance.

Further, there is reasonable doubt as to the future status of the Fort Point Channel bridges. The 1948 session of the Massachusetts General Court authorized and directed the Port of Boston Authority to study legislation necessary to provide for the filling and improvement of South Bay and part of Fort Point Channel.

The contemplated early replacement of the Meridian Street and Warren bridges has prompted the division to avoid maintenance expenditures on these structures beyond those necessary to insure their safety for the use of the public.

With the exception of the Chelsea South and Congress Street bridges, all of the movable bridges under the jurisdiction of the department appear to need painting. It was observed that steel work on the Northern Avenue bridge was showing signs of rust, records of the division indicating that the structure has not been repainted since it was rebuilt twelve years ago. Substantial repairs appear to be necessary on the steel work, decking, and pavement on the Broadway and Charlestown bridges. Replacement of the retractile spans on the two Summer Street bridges with bascule or lift spans is recommended.

In order to permit the division engineer to establish and follow a painting and preventive maintenance schedule, it is recommended that the appropriation for bridge repairs be increased to two hundred and fifty thousand dollars ($250,000) a year for the next five years. Expenditures of the division for bridge repairs during the past ten years were as follows:

Year	Expenditure
1938	$ 44,500
1939	23,200
1940	67,500
1941	25,600
1942	17,500
1943	11,800
1944	43,600
1945	53,200
1946	227,400
1947	176,000

In general, the condition of the steel work, decking, and pavement of the inland or fixed bridges appears superior to those of the movable bridges.

5. Ferry Subdivision

a. Staff of the Ferry Subdivision: The City of Boston at one time operated an extensive ferry service on two crossings known as the North Ferry and the South Ferry, respectively, running from the City proper to East Boston. Currently, service is maintained for sixteen hours daily on the South Ferry route, but the North Ferry run was discontinued several years ago.

Ferry traffic has shown a continuous decline for several years, vehicle traffic in particular having dropped off following the opening of the Sumner Traffic Tunnel in 1934. Pedestrian travel on the ferries began to decline after the completion in 1904 of the East Boston Tunnel to Maverick Station. This tunnel is part of the rapid transit system.

The City owns three ferries at the present time, the Daniel A. MacCormack and the Charles C. Donoghue built in 1926, and the Ralph J. Palumbo built in 1930. At the peak of the ferry service, seven boats were owned and operated. Of the three boats now owned, only one is operated at a time. The steamboat inspection service licenses each boat for a year, at the expiration of which time it is the division's policy to tie a boat up for one year with the fires in its boilers banked so it is available for operation under temporary license if the boat in service is damaged or incapacitated. The third ferry boat is not available for emergency operation as, under the division's maintenance schedule for ferry boats, each hull is gone over every third year. The boat is out of the water for a matter of several weeks and could not be pressed into service as a replacement unit during this overhaul period

The staff of the ferry subdivision, as of June 15, 1948, showing classification and salaries, was approximately as follows: (indentations show descending lines of authority):

Position	No. of Positions	Pay Rate Weekly	Pay Rate Annual	Annual Cost
Division engineer	-	$ -	$ -	$ -
Master machinist (acting supv.)	1	-	3,000	3,000
Captain	4	58.68	3,051	12,204
Engineer	4	57.68	2,999	11,996
Quartermaster	4	49.68	2,583	10,332
Oiler	5	49.18	2,557	12,785
Fireman	12	49.18	2,557	30,684
Deck hand	11	40.26	2,094	23,034
Tollman-gateman	14	40.26	2,094	29,316
Matron	4	29.68	1,543	6,172
Marine machinist	3	49.68	2,583	7,749
Ship carpenter	1	-	2,500	2,500
Ship joiner	1	44.76	2,328	2,328
Roofer-carpenter	1	44.76	2,328	2,328
Steam fitter	2	44.76	2,328	4,656
Boilermaker	1	44.76	2,328	2,328
Rigger	1	44.76	2,328	2,328
Laborer	6	38.76	2,016	12,096
Clerk-cashier	1	-	2,300	2,300
Stockkeeper	1	-	2,300	2,300
Total	77			$180,436

To operate the one boat in service, four complete ferry crews are carried on the payroll. Each crew consists of a captain, a quartermaster-pilot, an engineer, an oiler, a foreman, and two deck hands. Ten employes with the rating of firemen or deck hands cover, as watchmen and caretakers, the boatthat is not in active service and are available as replacements on the regular crews. A maintenance crew of twenty employes is retained to care for the terminal properties and to handle the normal repairs on the boats. Fourteen tollmen-gatemen cover the two terminals during the daily sixteen-hour schedule. A stockkeeper and a clerk-cashier complete the staff of the ferry supervisor.

A regular maintenance program, including the periodic overhaul of the hulls is provided for in the care of the three ferry boats. The terminal property at East Boston has been maintained satisfactorily. However, the property at the Boston terminal does not appear to have been maintained adequately.

No automotive equipment has been assigned to the ferry subdivision, although the procurement of a light unit to aid in snow removal and for pickup service would appear to be warranted. At the present time, the ferry supervisor calls on the tunnel service for the loan of a "jeep" to aid in snow removal and to perform errands.

The specialized type of equipment peculiar to maritime operations appears adequate for the needs of this service and is maintained in a generally satisfactory condition.

The reduction in force that would be possible by reducing the hours of operation from sixteen to twelve hours daily and the elimination of one boat crew together with a policy of not filling vacancies in the maintenance and toll collection group should permit a reduction in payroll cost of the ferry service in the amount of approximately twenty-five thousand dollars ($25,000) as an average for each of the next five years. It is recommended that future appropriations for the ferry service be limited to two hundred and fifty thousand dollars ($250,000) for operation and fifty thousand dollars ($50,000) for repairs and construction. If a fare and toll increase can produce revenue of fifty thousand dollars ($50,000) a year, continuation of the service at an annual loss of a quarter of a million dollars may be justified pending a decision as to whether a high level bridge will be erected to East Boston or whether a second tube of the Sumner Tunnel will be constructed. It would appear that there is not justification to continue the service at a cost of over a quarter of a million dollars a year to the taxpayers in view of the limited segment of the population of Boston that benefits from the service.

b. Ferry Service: The ferry between Boston proper and East Boston operates from 6:00 a.m. until 10:00 p.m., seven days a week. The extent to which this service is provided at a loss to the City of Boston is discussed under the heading of "Revenues". The facilities of the ferry are duplicated by the Sumner Tunnel for motor vehicles and by the East Boston Tunnel for foot passengers. Each of these facilities, however, provides service at higher tolls or fares. There is no alternative means for horsedrawn vehicles or pushcarts to cross from Boston to East Boston except for the round-about route provided by the bridges from East Boston to Chelsea, the spans from Chelsea to Charlestown, and the Charlestown-Warren bridge crossing of the lower Charles River Basin.

There is considerable doubt as to the necessity for the City to provide service for as many hours a day as are now provided, if indeed the service should be continued on any basis. The number of horsedrawn vehicles and pushcart crossings is declining from year to year and is of small consequence on Sundays or after 6:00 p.m. weekdays. Foot passenger crossings despite the toll of only a penny are approximately one-third of the number of a decade ago. The monthly average for the first six months of 1948 was just under 24,000.

Although there has been agitation for free ferry service between Boston and East Boston for a hundred years, the argument being advanced that the ferry provides a link in the highway system, and the residents of East Boston claiming that this service should be provided on the same basis as bridges provide access to Boston from South Boston, actually the service for foot passengers benefits only a part of the East Boston area. Those who live or work any distance from either terminus presumably take other means of public transportation, even though the fare is ten cents as against the penny rate on the ferry.

While it seems to be generally acknowledged that the ferry service cannot be made self-sustaining, there is a question of policy which should determine the size of the annual deficit that it is proper for the taxpayers of the City to make up for the benefit of a relatively small minority. Therefore, if for no other reason than to establish the necessity for the service, as distinguished from its attractiveness to its patrons from a cost standpoint, it is recommended that the present penny rate for foot passengers which was established by the city council in 1887 be increased to five cents and that toll rates for motor vehicles be set at one-half the tunnel rate for each comparable classification. It is recommended that the present rate of five cents be continued for handcarts, one-or two-horsedrawn vehicles, horses and cattle (each with rider or attendant) and that no change be made in the ten cent rate for three- or four-horse vehicles. If an appreciable decline in foot passenger traffic follows these increases in rates, it is recommended that the ferry service be discontinued at the expiration of a pre-announced period during which time those who depend upon the ferry to cross the harbor with horsedrawn vehicles or pushcarts would have the opportunity to make other arrangements.

It is further recommended that the hours of service provided by the ferry be reduced to twelve a day and the number of boat crews be reduced to three. It is recommended that the hours of operation be from 6:00 a.m. until 6:00 p.m.

During the next five years, according to personnel records of the division one of each class of licensed officer - captain, engineer, and quartermaster-pilot - will reach the statutory retirement age. It is recommended that these employes not be replaced upon their retirement but that until then they be retained in the ferry service in addition to the three full crews recommended to provide for emergencies and to aid in covering vacation schedules. Further, it is recommended that vacancies that are created in the maintenance group be left unfilled and that any necessary repairs to terminal facilities be made by employes of the bridge service if assistance is required. The avergae age of maintenance employes in the ferry service other than laborers is sixty years, and the average length of service is 20.5 years. There are 4 tollmen or gatemen with over 30 years of service and with an average age of 67 years. The vacancies to be caused by the retirement of these men should not be filled.

If the hours of service for the ferry are reduced to 12 hours a day, it is estimated that annual savings of approximately $20,000 on coal and $10,000 on fuel and supplies could be realized.

c. Ferry Revenues and Expenditures: The daily revenue of the ferry service is sufficient to meet only a fraction of the operating costs. Monthly traffic and revenue for the months of January and June, 1948 are tabulated below:

Jan. 1948	1 or 2 Horse Vehicle	Push Cart	Trailer	3 or 4 Horse Vehicle	Auto 1 Passenger	Auto 1 Plus Passenger
No. of Vehicles	107	28		8	1846	21
Receipts	$ 5.35	$ 1.40		$ 0.80	$184.60	$3.15
June 1948						
No. of Vehicles	448	541	1	2	8387	38
Receipts	$22.40	$27.05	$0.10	$0.20	$838.70	$5.70

Jan. 1948	Truck 6 Ton or Less	Truck 6-10 Ton	Bus	Free Vehicle	Passenger
No. of Vehicles	117	13	6	6	16,287
Receipts	$17.55	$ 2.60	$1.20	-	$162.87
June 1948					
No. of Vehicles	551	81	3	21	28,057
Receipts	$82.65	$16.20	$0.60	-	$280.57

Revenues from the ferry service from 1858 to 1941, inclusive, were as follows:

Receipts from rents, etc., previous to purchase of ferries	$ 29,588.56
Receipts from ferry tolls since purchase of ferries	8,667,134.42
Receipts from rents since purchase of ferries	74,041.57
Receipts from sale of ferry boats	168,004.57
Receipts from all other sources per ferry books	38,592.78
Receipts from all other sources per city	30,734.85
	$9,008,096.75

Receipts from tolls from 1942 to 1947, inclusive, were as follows:

Year	Receipts From Foot Passengers	Receipts From Vehicles	Total Receipts
1942	$8,860.06	$8,131.45	$16,991.51
1943	5,634.20	5,392.46	11,026.66
1944	4,505.60	5,642.36	10,147.96
1945	3,765.60	6,356.48	10,122.08
1946	3,568.42	9,030.85	12,599.27
1947	3,442.55	9,479.20	12,921.75

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[illegible]	[illegible]	[illegible]	[illegible]

The total expenditures by the City of Boston on ferries from 1858 to 1941, inclusive; were as follows:

Expenditures for avenues, paving, interest, etc., previous to purchase of ferries by the City	$ 444,101.30
Purchase of the ferries, April 1870	276,275.00
Expenditures for ferry boats since April 1, 1870	2,530,009.81
Expenditure for new buildings, piers, drops, etc.	1,491,468.59
Expenditure for tools & fittings (prior to 1910)	14,752.46
Expenditure for land for Lincoln's Wharf in 1887	5,562.52
Expenditure for land for Battery Wharf in 1893	10,000.00
Total expenditures on capital accounts	$ 4,772,269.68
Expenditures for repairs of all kinds	3,092,326.67
Expenditures for fuel	3,263,609.45
Expenditures for salaries and wages	13,285,710.44
Expenditures for all other purposes	3,564,548.14
Grand Total	$27,978,464.38

Expenditures of the ferry service from 1942 to 1947, inclusive, were as follows:

Year	Operation	Repairs and Construction	Total Expenditures
1942	$228,010.12	$ 9,972.86	$237,982.98
1943	222,871.80	22,824.58	245,696.38
1944	215,406.69	27,076.95	242,483.64
1945	223,651.43	25,716.27	249,367.70
1946	240,537.12	10,997.25	251,534.37
1947	266,870.15	45,764.84	312,634.99

These reported operating costs do not include depreciation on plant and equipment and indicate that, exclusive of this item, the annual loss on the ferry at the present wage level and at the present cost of supplies and contract labor is over $300,000.

6. Tunnel Subdivision

a. Staff of the Tunnel Subdivision: There are 45 employes assigned to toll collections and to patrolling the catwalk of the tunnel; 7 employes in the cashier's office; and 25 employes engaged in cleaning the tunnel, the plaza at either end of the tunnel, the two ventilating buildings, and the administration building and in performing such duties and services as towing disabled vehicles from the tunnel, doing clerical work, and acting as messengers. The electrical and mechanical equipment is controlled and maintained by a force of 20 employes. Part of the administrative workload is carried by an electrical engineer.

The ratings and salaries of these employes are shown in the following tabulation in which indentations show descending lines of authority:

Position	No. of Positions	Pay Rate Weekly	Pay Rate Yearly	Annual Cost
Division engineer	-	-	-	-
Superintendent	1	-	$3800	$ 3,800
Chief electrician	1	-	3500	3,500
Electrician	17	-	2900	49,300
Machinist	2	-	2700	5,400
Electrical engr.	1	-	3400	3,400
Clerk	1	-	2800	2,800
Cashier	1	-	3700	3,700
Clerk-cashier	1	-	2600	2,600
Clerk	1	-	2400	2,400
Clerk-steno.	1	-	2300	2,300
Clerk-typist	1	-	2200	2,200
Clerk-typist	1	-	1700	1,700
Sergeant tollman-guard	5	-	2700	13,500
Tollman-guard	40	-	2400	96,000
Work foreman-auto. mech.	1	$47.76	2484	2,484
Chauffeur	14	41.76	2172	30,408
Labor	9	38.76	2016	18,144
Totals	98			$243,636

The duties of each employe are clearly defined and the manner in which these duties are to be performed is set forth in clear terminology for tollmen, for garagemen, and for those employes charged with the inspection and control of operating equipment.

A schedule for cleaning, for painting, and for electrical maintenance has been established by the tunnel superintendent. The schedule appears to meet requirements adequately.

It is necessary to station two towing trucks at the tunnel to assure adequate facilities for the removal of disabled vehicles. A 1 1/2-ton unit takes care of the majority of calls but a 10-ton unit is available to permit the removal of busses, heavy trucks, and trailer combinations. The use of a spraying truck and a mechanical sweeper reduce the labor that would be necessary if these operations were performed manually.

Non-automotive equipment, such as automatic counting devices at the toll gates, coin counting machines, and ventilators are relatively new and in good repair. Because the tunnel service is the newest of the three subdivisions of the bridge and ferry division and its facilities are of modern design and construction, the problems of maintenance of plant and equipment are less serious than those in the other two subdivisions.

b. Tunnel Service: The tunnel is open 24 hours a day, which is justified on the basis of the traffic figures showing passage of vehicles and in view of the importance of this means of access to the Logan International Airport at East Boston. Traffic flow through the two-way single tube is hampered by cross-traffic at each entrance. Sound measures have been taken to handle congestion at the entrance by providing a separate gate for city-owned vehicles which pay no toll and for busses, the owners of which pay monthly for the passage of their vehicles.

c. Tunnel Revenues and Expenditures: Receipts from tolls for vehicles using the Sumner Traffic Tunnel, from 1934 to 1947 inclusive, were as follows:

Year	Amount
1934-1935	$ 424,765.00*
1935-1936	975,769.90
1936	653,917.22*
1937	808,951.81
1938	836,379.57
1939	898,356.82
1940	960,384.66
1941	1,110,452.22
1942	991,160.64
1943	1,026,241.71
1944	1,288,090.00
1945	1,455,246.18
1946	1,709,491.00
1947	1,758,149.30

*9 months

The expenditures of the tunnel subdivision covering the operation and maintenance of the Sumner Tunnel for the past ten years were as follows:

Year	Total Expenditures	Personal Services*
1938	$218,527.98	$156,508.98
1939	221,276.68	155,472.12
1940	229,635.64	153,522.16
1941	232,761.65	152,364.98
1942	253,050.59	167,133.03
1943	243,257.21	172,187.73
1944	260,220.64	176,431.65
1945	288,390.83	204,198.67
1946	334,345.71	217,225.16
1947	395,060.35	231,675.88

*Included in total expenditures

The cost of operating and maintaining the tunnel appears to be reasonable and no recommendations are offered with respect to adjustment in the number of employes assigned to the tunnel service. If a specialized piece of equipment under consideration by the superintendent permitting mechanical washing of the tunnel walls by rotary brushes is made available, it is believed that the labor force might then be reduced by three employes. It is not recommended that the tunnel maintenance force be reduced to the impairment of the present program of cleaning and inspection. Reduction, therefore, will depend largely on the possibility of replacing hand-cleaning with mechanical methods.

b. Savings in the Ferry Subdivision: For the ferry subdivision the savings possible through the adoption of the recommendations in this report may be summarized as follows:

Reduction in the number of ferry boat crews from 4 to 3 and a reduction in the number of firemen and deck hands assigned watchman duties	$19,500
Reduction in payroll cost in the maintenance force if vacancies are not filled (estimated)	6,500
Reduction in coal consumption (estimated)	20,000
Reduction in consumption of fuel and supplies (estimated)	10,000
Total savings, ferry subdivision	$56,000

Note: The increase or decrease in revenue that would follow the fare increase recommended in this report is not possible to determine without a detailed traffic study to determine the origin and destination of patrons.

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c. Savings in the Tunnel Subdivision: For the tunnel subdivision there is only one possible saving which may be summarized as follows:

After an estimated capital expenditure of $2,500 for additional mechanical equipment, a reduction in the number of laborers (3 at $2,015 each)	$ 6,045

d. Savings in the Bridge and Ferry Division: For the bridge and ferry division, the gross and net savings possible through the adoption of the recommendations in this report may be summarized as follows:

Gross Savings:

Bridge subdivision	$ 92,400
Ferry subdivision	56,000
Tunnel subdivision	6,045
Total	$154,445

Net Savings:

Bridge subdivision	$ 18,400
Ferry subdivision	56,000
Tunnel subdivision	6,045
Total	$ 80,445

The gross and net savings recorded above will increase each year if vacancies in the ferry service are not filled.

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